

LISTING OF CLAIMS:

1. (Currently amended) A vehicle brake system for generating braking force in each vehicle wheel according to operation of a brake pedal, comprising:

a braking force regulating portion that is controlled by dither current and generates the braking force;

a brake noise detecting portion for detecting at least one of brake noise generation and a possibility thereof in each vehicle wheel; and

a control portion for controlling the dither current, wherein

when either the brake noise generation or the possibility thereof is detected by the brake noise detecting portion, the control portion changes at least one of an amplitude and a cycle of the dither current to suppress brake noise by applying, to the braking force regulating portion, a vibration with a frequency different from a self-excited vibration of the brake noise.

2. (Original) The vehicle brake system according to claim 1, further comprising;

a master cylinder for generating a master cylinder pressure;

a wheel cylinder provided for each vehicle wheel for receiving the master cylinder pressure that is introduced from the master cylinder through a brake conduit, thereby applying wheel cylinder pressure to each wheel cylinder to generate braking force in the vehicle wheel; and

a pump for sucking up brake fluid from the master cylinder and discharges the brake fluid between the linear valve and the wheel cylinder is further provided; wherein

the braking force regulating portion is a linear valve that is provided upstream of the wheel cylinder and generates differential pressure proportional to an amount of current supplied; and

the control portion changes at least one of the amplitude and the cycle of the dither current to be supplied to the linear valve, thereby generating hydraulic pulsation in accordance with a dither cycle of the dither current.

3. (Original) The vehicle brake system according to claim 2, further comprising:

a normally-open increase control valve provided between the linear valve and the each wheel cylinder, wherein

the control portion executes switching control of the each increase control valve and generates the hydraulic pulsation in

only a vehicle wheel that has been determined to have brake noise generation.

4. (Original) The vehicle brake system according to claim 2, wherein the dither frequency is lower than a resonance frequency of a brake caliper or a rotor of each vehicle wheel.

5. (Original) The vehicle brake system according to claim 1, wherein the braking force regulating portion is a brake driving actuator provided for each vehicle wheel, and the control portion superimposes the dither current on a target current which is determined according to the amount of depression of the brake pedal, and supplies the brake driving actuators of each vehicle wheel with the target current, as output current, onto which the dither current is superimposed, so as to drive the brake driving actuator, thereby generating braking force in each wheel.

6. (Original) The vehicle brake system according to claim 5, wherein the cycle of the dither current for the brake driving actuator of the vehicle wheel is reduced when the brake noise generation or the possibility thereof exists.

7. (Original) The vehicle brake system according to claim 5, wherein the amplitude of the dither current for the brake driving actuator of the vehicle wheel is increased when the brake noise generation or the possibility thereof exists.

8. (Original) The vehicle brake system according to claim 5, wherein the cycle and the amplitude of the dither current for the brake driving actuator of the vehicle wheel are both reduced when the brake noise generation or the possibility thereof exists.

9. (Original) The vehicle brake system according to claim 5, wherein the cycle and the amplitude of the dither current for the brake driving actuator of the vehicle wheel are both increased when the brake noise generation or the possibility thereof exists.

10. (Previously presented) The vehicle brake system according to claim 1, wherein there is provided one linear valve, in the brake force regulating portion, to which the dither current is supplied.

11. (Previously presented) The vehicle brake system according to claim 1, wherein the brake noise detecting portion detects a vibration of a caliper in a wheel.

12. (Previously presented) The vehicle brake system according to claim 1, wherein the brake noise detecting portion detects at least one of a vehicle wheel speed signal, a vehicle speed signal, and an outside air temperature signal.

13. (Currently amended) A vehicle brake system for generating braking force in each vehicle wheel according to operation of a brake pedal, comprising:

a braking force regulating portion that is controlled by dither current and generates the braking force;

a brake noise detecting portion for detecting at least one of brake noise generation and a possibility thereof in each vehicle wheel;

a control portion for controlling the dither current, wherein when either the brake noise generation or the possibility thereof is detected by the brake noise detecting portion, the control portion changes at least one of an amplitude and a cycle of the dither current to suppress brake noise by applying, to the braking force regulating portion, a

vibration with a frequency different from a self-excited
vibration of the brake noise;

a master cylinder for generating a master cylinder pressure;

a wheel cylinder provided for each vehicle wheel for receiving the master cylinder pressure that is introduced from the master cylinder through a brake conduit, thereby applying wheel cylinder pressure to each wheel cylinder to generate braking force in the vehicle wheel; and

a pump for sucking up brake fluid from the master cylinder and discharges the brake fluid between the linear valve and the wheel cylinder is further provided;

wherein the braking force regulating portion is a linear valve that is provided upstream of the wheel cylinder and generates differential pressure proportional to an amount of current supplied;

wherein the control portion changes at least one of the amplitude and the cycle of the dither current to be supplied to the linear valve, thereby generating hydraulic pulsation in accordance with a dither cycle of the dither current; and

wherein the brake noise detecting portion detects a vibration of a caliper in a wheel at least one of a vehicle wheel speed signal, a vehicle speed signal, and an outside air temperature signal.

14. (Currently amended) A method for providing a vehicle brake system for generating braking force in each vehicle wheel according to operation of a brake pedal, comprising:

generating braking force, in a braking force regulating portion, responsive to dither current;

detecting, in a brake noise detecting portion, at least one of brake noise generation and a possibility thereof in each vehicle wheel; and

controlling, in a control portion, the dither current, wherein

when either the brake noise generation or the possibility thereof is detected by the brake noise detecting portion, changing, in the control portion, at least one of an amplitude and a cycle of the dither current to suppress brake noise by applying, to the braking force regulating portion, a vibration with a frequency different from a self-excited vibration of the brake noise.

15. (Previously presented) The method according to claim 14, further comprising:

generating, in a master cylinder, a master cylinder pressure;

receiving, in a wheel cylinder provided for each vehicle wheel, the master cylinder pressure that is introduced from the master cylinder through a brake conduit, thereby applying wheel cylinder pressure to each wheel cylinder to generate braking force in the vehicle wheel;

sucking up, in a pump, brake fluid from the master cylinder and discharging the brake fluid between the linear valve and the wheel cylinder;

generating, in a linear valve that is provided upstream of the wheel cylinder, differential pressure proportional to an amount of current supplied; and

changing, in the control portion, at least one of the amplitude and the cycle of the dither current to be supplied to the linear valve, thereby generating hydraulic pulsation in accordance with a dither cycle of the dither current.

16. (Previously presented) The method according to claim 15, further comprising:

executing, in the control portion, switching control of a normally-open increase control valve provided between the linear valve and each wheel cylinder, and generating the hydraulic pulsation in only a vehicle wheel that has been determined to have brake noise generation.

17. (Previously presented) The method according to claim 15, wherein the dither frequency is lower than a resonance frequency of a brake caliper or a rotor of each vehicle wheel.

18. (Previously presented) The method according to claim 14, wherein the braking force regulating portion is a brake driving actuator provided for each vehicle wheel, the control portion superimposing the dither current on a target current which is determined according to the amount of depression of the brake pedal, and supplying the brake driving actuators of each vehicle wheel with the target current, as output current, onto which the dither current is superimposed, so as to drive the brake driving actuator, thereby generating braking force in each wheel.

19. (Previously presented) The method according to claim 18, further comprising at least one of reducing the cycle of the dither current for the brake driving actuator of the vehicle wheel when the brake noise generation or the possibility thereof exists; and increasing the amplitude of the dither current for the brake driving actuator of the vehicle wheel when the brake noise generation or the possibility thereof exists.

20. (Previously presented) The method according to claim 18, further comprising at least one of reducing the cycle and the amplitude of the dither current for the brake driving actuator of the vehicle wheel when the brake noise generation or the possibility thereof exists; and increasing the cycle and the amplitude of the dither current for the brake driving actuator of the vehicle wheel when the brake noise generation or the possibility thereof exists.